

In the Claims:

1. (Currently amended) A method of manufacturing an integrated circuit device, comprising:

forming an insulation layer that comprises oxygen between upper and lower conductive layers, the insulation layer having a first surface portion that is exposed by the upper and lower conductive layers and a second, non-exposed, surface portion at an interface with the upper conductive layer; and

exposing the insulation layer to a metal precursor that is reactive with oxygen so as to form a first metal oxide layer on the first surface portion of the insulation layer without forming the first metal oxide layer on the second surface portion of the insulation layer, such that the first metal oxide layer and the second surface portion of the insulation layer do not overlap.

2. (Previously amended) The method of Claim 1, wherein exposing the insulation layer to the metal precursor comprises:

pulsing the metal precursor over the integrated circuit device; and
exposing the integrated circuit device to an inert gas.

3. (Original) The method of Claim 2, wherein pulsing the metal precursor is performed for a duration of about 0.1 to 2 seconds and at a flow rate of about 50 to 300 sccm.

4. (Original) The method of Claim 2, wherein exposing the integrated circuit device to an inert gas is performed for a duration of about 0.1 to 10 seconds and at a flow rate of about 50 to 300 sccm.

5. (Original) The method of Claim 2, wherein pulsing the metal precursor comprises:

pulsing the metal precursor and a carrier gas over the integrated circuit device.

6. (Original) The method of Claim 5, wherein the carrier gas is argon.

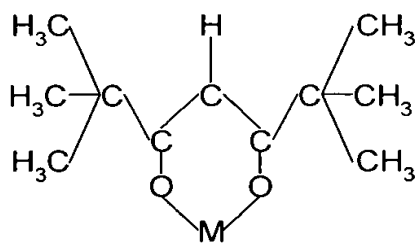
7. (Original) The method of Claim 2, further comprising:

thermally treating the integrated circuit device in an oxygen atmosphere using one of a rapid thermal processing apparatus and a furnace type thermal processing apparatus.

8. (Original) The method of Claim 7, wherein thermally treating the integrated circuit device comprises:

thermally treating the integrated circuit device in the oxygen atmosphere using a rapid thermal processing apparatus at a temperature of about 400 to 600°C for a duration of about 10 seconds to 10 minutes.

9. (Original) The method of Claim 1, wherein the metal precursor comprises a gas selected from the group of gases consisting of TriMethyl Aluminum (TMA), DiMethylAluminum Hydride (DMAH), DiMethylEthylAmine Alanè (DMEAA), TriIsoButylAluminum (TIBA), TriEthyl Aluminum (TEA), TaCl₅, Ta(OC₂H₅)₄, TiCl₄, Ti(OC₂H₅)₄, ZrCl₄, HfCl₄, Nb(OC₂H₅)₅, Mg(thd)₂, Ce(thd)₃, and Y(thd)₃, wherein thd is given by the following structural formula:



10. (Previously amended) The method of Claim 1, wherein exposing the insulation layer to the metal precursor is performed at a temperature of about 100 to 400°C and at a pressure of about 0.1 to 1 torr.

11. (Original) The method of Claim 1, wherein the insulation layer comprises a capacitor dielectric layer.

12. (Original) The method of Claim 1, wherein the insulation layer comprises a material selected from the group of materials consisting of: TiO_2 , SiO_2 , Ta_2O_5 , Al_2O_3 , BaTiO_3 , SrTiO_3 , $(\text{Ba}, \text{Sr})\text{TiO}_3$, $\text{Bi}_4\text{Ti}_3\text{O}_{12}$, PbTiO_3 , $\text{PZT}((\text{Pb}, \text{La})(\text{Zr}, \text{Ti})\text{O}_3)$, and $(\text{SrBi}_2\text{Ta}_2\text{O}_9)(\text{SBT})$.

13. (Original) The method of Claim 1, further comprising:
encapsulating the first metal oxide layer and the insulation layer in a second metal oxide layer.

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